JAMES A. GRAASKAMP COLLECTION OF TEACHING MATERIALS

II. CLASSES AT THE UNIVERSITY OF WISCONSIN--MADISON

I. Business 760: Real Estate Equity Investment

3. Student Projects and Problem Sets

Index

EQUITY INVESTMENT 760
Financial-Office Design Problem, Fall, 1970

Assume there are five basic capital cost factors in an office building project, land, structure, mechanical services, elevators, and parking stalls.

1. Land costs $5 per square foot and the ratio of gross building area to land area cannot exceed a ratio of more than ten to one. The smallest site available is 15,000 square feet but additional land can be purchased in 10,000 square foot increments. Gross area of a single floor cannot exceed 80% of lot area.

2. All structural items for an office including all tenant improvements, design fee, and indirect charges during construction cost $20 per gross square foot of floor area. This is the average cost for high rise construction and one can reduce structural cost by $4.00 per gross square foot if the building is only two stories high. For tax depreciation structural costs have a useful life for 40 years and are 90% depreciable.

3. Mechanical equipment in the structure will cost an additional $10 per gross square foot excluding elevators. However, the investment in mechanical equipment must be built in modules of what is necessary to serve the gross area of at least three times a single floor gross area. Thus if the floor area is 10,000 square feet mechanical costs would be 3 X 10,000 X 10 even if the building were only two stories high. For tax purposes, mechanical items including outside parking paving have an average useful life of 10 years and are 100% depreciable.

4. Elevators cost $10,000 each per floor; there must be a minimum of two elevators and an additional elevator for each 10,000 gross square feet in excess of the first 50,000. Tax treatment - same as mechanical.

5. For an outside parking stall 400 square feet of land is required plus $300 per stall for paving and landscaping, a cost which can be depreceated on the same basis as mechanical equipment. As an alternative an inside parking ramp stall can be built in the basement for $2500 per unit, no additional land is required and it has the same useful life as the structure. An office building should have at least one parking space per 500 square feet of rentable area and the use of the stall is included in the rent schedule, Only 80% of the gross square footage in an office building can be considered rentable.

The current market rent for office space is $8.00 per square foot of rentable area and operating expenses run at $2.00 per square foot of rentable area. Real estate taxes run at $.20 per square foot of land per year plus $.80 per square foot of gross building area. Assume real estate taxes will be held constant because of escalator clauses in tenant leases. Make any reasonable assumptions on the rate of increase in rents and expenses that you wish. You may stage your project if you wish because the market cannot absorb more than 40,000 square feet of rentable space in this price range in one year. To work with limitations of mini model, however, you would need to buy all the land and provide all of the parking space required of the completed project in the first year.

Money is available for office construction under two options:

Option 1 - A loan for 75% of total cost for 8 1/2% interest amortized in 20 years. Default ratio not to exceed .85 after first year.

Option 2 - A loan for 90% of total cost for 8 1/2% interest plus 3% of gross as participation for 30 years. Default ratio not to exceed .93 after first year.

Describe an office project which you think would be feasible, prudently financed, and would return a minimum of 15% on an after-tax basis if held for at least 7 years and then sold for its original cost, under existing income tax rules. Rate of return should equal payback period in years plus 10%.

EQUITY INVESTMENT 760
Financial-Office Design Problem, Fall, 1972

Assume there are five basic capital cost factors in an office building project, land, structure, mechanical services, and parking stall.

1. Land costs $4 per square foot and the ratio of gross building area to land area cannot exceed a ratio of more than ten to one. The smallest site available is 15,000 square feet but additional land can be purchased in 5,000 square foot increments. Gross area of a single floor cannot exceed 80% of lot area.

2. All structural items for an office including all tenant improvements, design fee, and indirect charges during construction cost $20 per gross square foot of floor area. This is the average cost for high rise construction and one can reduce structural cost by $4.00 per gross square foot if the building is only two stories high. For tax depreciation structural costs have a useful life for 40 years and are90% depreciable.

3. Mechanical equipment in the structure will cost an additional $7 per gross square foot excluding elevators. However, the investment in mechanical equipment can be no less than what is necessary to serve the gross area of at least three times a single floor gross area. Thus if the floor area is 10,000 square feet mechanical costs would be 3 x 10,000 x 8 even if the building were only two stories high. For tax purposes, mechanical items including outside parking paving have an average useful life of 10 years and are 100% depreciable.

4. Elevators cost $10,000 each per floor; there must be a minimum of two elevators and an additional elevator for each 10,000 gross square feet in excess of the first 50,000. Tax treatment--same as mechanical.

5. For an outside parking stall 400 square feet of land is required plus $300 per stall for paving and landscaping, a cost which can be depreciated on the same basis as mechanical equipment. As an alternative an inside parking ramp stall can be built in the basement for $3000 per unit, no additional land is required and it has the same useful life as the structure. An office building should have at least one parking space per 500 square feet of rentable area and the use of the stall is included in the rent schedule. Only 80% of the gross square footage in an office building can be considered rentable.

The current market rent for office space is $8.00 per square foot of rentable area and operating expenses run at $2.00 per square foot of rentable area. Real estate taxes run at $.20 per square foot of land per year plus $1.00 per square foot of gross building area plus $50 per indoor parking stall. Assume real estate taxes will be held constant because of escalator clauses in tenant leases. Rents may increase at only 2/3's the rate of expenses and first run should hold rents and expenses constant, with a reasonable increase a permissible assumption only if necessary to meet required yield to equity. You may stage your project if you wish because the market cannot absorb more than 40,000 square feet of rentable space in this price range in one year. To work with limitations of mini model, however, you would need to buy all the land in the first year.

Equity Investment 760

Money is available for office construction under two options:

Option 1 - A loan for 75% of total cost for 7 1/2% interest amortized in 20 years. Default ratio not to exceed .80 after first year.

Option 2 - A loan not to exceed (may be less) 95% of total cost for 9% interest plus 2% of gross as participation for 30 years. Default ratio not to exceed .90 after first year.

Describe an office project which you think would be feasible, prudently financed, and would return a minimum of 20% on an after tax basis if held for at least 7 years and then sold for its original cost, under existing income tax rules. Opportunity cost of equity capital is 10% and equity payback should not exceed 5 years unless an additional 2% yield per year after tax is available for each additional year required for payback of equity.

UNIVERSITY OF WISCONSIN SCHOOL OF BUSINESS
Real Estate Investment Teaching Model
September , 1969
Instructions For Use of the Coding Form

GENERAL

1. Cards were designed to require no change in field spacing stops set on the keypunching machine so that large batches of input forms may be done at once and so that a student may keypunch single cards to alter one or more assumptions for a second or third run.
2. One character or number for each blank. Decimal points, "X's", "-s" may not be altered or written over.
3. All dollar amounts must be coded in the rightmost portion of the allowed space - do not include dollar signs. Decimal figures must be corrected to the left relative to pre-printed decimal point.
4. For numerical inputs blank spaces will be read as a zero (0); for alphabetical inputs, blank spaces will provide white space on the output.

CARD 1

1. Last two digits of social security number required to differentiate between those with the same name.
2. Course and section number required for internal school accounting.
3. The equity discount rate is the yield rate at which the investor wishes to determine the present value of the project, discounting all cash returns to the beginning of the first period.
4. The income tax rate is the marginal rate assumed by the investor.
5. "#Cards #3" indicates the number of component description cards (1-6) in column 61. "# cards #4" indicates the number of mortgage cards (1-4) in column 64. Failure to code these properly will terminate processing of your data and you will receive no output.

CARD 2

1. Project description can be an address, firm name, or description of project and run such as "24 Unit Apart. - 90% loan".
2. Extraordinary expenses can be used to deduct for high vacancies in first year, to eliminate excess rents in the first year, to recognize commissions for leasing space, to permit higher operating costs during a "shake down" year, etc.
3. The staging multiplier permits an optional increase in gross rent, expenses, and real estate taxes due to an increase in rentable area provided for in the Component Description and Mortgage Description cards Starting Year column. Indicate year increase is to take effect in column marked "staging year" (1-9) DO NOT STAGE IN TENTH YEAR! Both year and multiplier must be coded but if staging option is not used leave both coding spaced blank.

CARD 3

1. Component description might be land, structure, and furnishings and you would repeat these categories if you wished to build a second stage.
2. % depreciable is 100% minus % of salvage.
3. Depreciation method code:

   0 = no depreciation
   1 = sum of the digits
   2 = straight line depreciation
   3 = 150% declining balance
   4 = 200% declining balance

4. Starting year is always a 1 for the original investment components and the staging year for any additions or replacement of such short-lived items as furniture.
5. Useful life is number of years over which component will be depreciated (0-99).

CARD 4

1. Mortgage description may include any type of financial instrument. For example, a land lease could be defined as a site worth $300,000, monthly payment would be 1/12 of annual rent and interest rate would be the annual rent divided by the indicated value of the land.
2. Interest rates are constant annual rates. 8.5% interest = .0850.
3. Starting and Ending years are the first and last years payments are to be made.
4. If mortgage term is longer than ten years or is not refinanced, place a 10 in the column "Ending Year."
5. Indicate full amortization term in years of mortgage in column "Term".
6. You must indicate which new mortgage will replace a specific old mortgage. Otherwise if a loan matures during a projection period, final balance will appear in cash flow statement as "Principal Payment" and if it succeeds available cash, there will be an automatic working capital loan.

CARD 5

1. Expenses do not include real estate taxes. Expenses may include only cash outlay items or may include reserves for replacement and redecorating. In the first case you may wish to include several incremental cost component outlays for remodeling and refurnishing as an alternative to regular maintenance and reserve allocation.
2. All growth rates are constant annual rates. 5% growth rate = .05
   - 5% growth rate = -.05

   Patterns of growth rates should be consistent; if rents are constant and expenses are expected to increase, project value rate of growth should probably decline.

CARD 6

1. Real estate taxes are for the first year. In Madison the average annual growth in real estate taxes is exceeding 6% and an average increase of 5% a year is the typical minimum rate of tax increase in cities throughout Wisconsin.

CARD 7

1. The vacancy rate is the percent of rent lost due to vacancy and turnover. For example, if an apartment has 10 units it has 120 monthly rental units. If 6 units turn over and are vacant 1 month the vacancy rate is 6/120 or 5%.
2. The working capital loan interest rate is either the 90 day note rate at the bank or the equity discount rate reflecting the yield required on short-term advances of equity money.

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Real Estate Investment Teaching Model

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Card 1

Student's Name	Last 2 Digits of Social Security #	Course & Section #'s	Equity Discount Rate	Income Tax Rate	# Cards #3	# Cards #4
GRAAS KAMP	77	520-1	.1800	.3000	6	4

Card 2

Project Description	Extraordinary Expenses	Staging Multiplier	Staging Year
24 UNIT APT - CASE 1	7625	.	

Card 3

Component Description	Original Cost	Percent Depreciable	Depreciation Method	Starting Year	Useful Life
LAND	40000	0.0000	00		100
BUILDING	177500	1.0000	03		135
PARKING	7500	0.5000	03		110
FURNISHINGS	13200	1.0000	01		107
TRANSACTION COST	1800	1.0000	03		135
7 TH YR REFERBISHING	10000	1.0000	01		8 07

Card 4

Mortgage Description	Principal Amount	Monthly Payment	Interest Rate	Bonus Interest Rate	Start	End	Term	Refinanced By Mortgage #
FIRST ASSUMED MORTG.	180000		0.0775	.	01	05	20	03
SELLERS 2ND MORTG.	15000		0.0850	.	01	05	10	03
REFINANCED FIRST	190000		0.0800	0.0400	06	10	20	
REFERBISH CHATTEL	10000	150	0.0900	.	08	10		

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September , 1969

Card 5

Gross Rent	Expenses	Rental Growth Rate	Expense Growth Rate
X 46080 X	8400 X	.0200 X	.0200 X

Card 6

R E Taxes	R E Tax Growth Rate	Project Value Rate of Growth
X 9000 X	.0500 X	.0100 X

Card 7

Vacancy Rate	Working Capital Loan Interest Rate
.0500 X	.0900 X

To code Depreciation Method, use the following code no's.

0 = no depreciation
1 = sum of the digits
2 = straight line depreciation
3 = 150% declining balance
4 = 200% declining balance

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Real Estate Investment Teaching Model
September, 1969
Basic Definitions of Model Outputs

1) Current period return on Net Worth before taxes =

$$\frac{\text{Cash Throw-off + Change in Net Worth}}{\text{Net Worth at End of Previous Year}}$$

2) Current period return on net worth after taxes =

$$\frac{\text{Spendable cash + tax savings on other income + (change in net worth - change in cap. gains tax)}}{\text{Net worth at the end of previous year less capital gains tax}}$$

3) Cash Return on original cash equity before taxes =

$$\frac{\text{Cash throw-off}}{\text{Total initial investment less Initial Mortgage Debt}}$$

4) Cash Return on original equity cash after taxes =

$$\frac{\text{Spendable Cash after taxes + Tax savings on other income}}{\text{Total initial investment cost less initial mtge. debt}}$$

5) Net income - market value ratio

$$\frac{\text{Net Income}}{\text{Market Value for the same period}}$$

6) Expense Ratio =

$$\frac{\text{Operating Expenses Including R.E. Taxes}}{\text{Gross Income}}$$

7) Default ratio =

$$\frac{\text{Operating Exp. + R. E. Taxes + Prin. \& Interest on Mtge. + Working Cap. Loan Princ. Repayment}}{\text{Gross Income}}$$

8) Lender Bonus Interest Rate =

$$\frac{\text{\% of effective gross (not to exceed cash throw-off for period)}}{\text{balance due on loan at beginning of period}}$$

9) Resale Market Value at End of year

Total initial investment cost + Additional staged investment X Index for Year

10) Net worth of property =

Market value less balance of loans less working capital loans

11) Capital Gains =

Market value projection - (Total capital investment - cumulative depreciation taken)

12) Market value less (total investment less cumulative depreciation + disallowed excess depreciation)

13) Capital Gains Tax =

(1/2 Capital Gain X Income Tax Rate) + (disallowed excess depreciation X income tax rate)

14) Present value of project before taxes =

Original mortgage balance + PV of received stream of cash throw-off + PV of net worth if sold at end of year indicated by column number.

15) Present value of project after taxes =

Original mortgage balance + present value of received stream of spendable cash after taxes + PV of received tax savings on other income + PV of (net worth less capital gains tax) if sold at end of year indicated by column number.

Disallowed excess depreciation = cumulative accelerated depreciation less straight line depreciation for the same period minus 12% of accelerated depreciation in excess of straight line for each year after year 11.